

**WEATHER PREDICTION METHOD
FOR FORECASTING SELECTED EVENTS**

ABSTRACT OF THE DISCLOSURE

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The invention provides methods, systems, and computer program products for short term probability forecasting of selected weather-related events. These embodiments are adaptable for any geographical region that can be identified and for which a reasonable number of data points exist. The
10 inventive method uses a data set of n observations of m parameters, where the parameters may be statistically correlated. A Principal Component Analysis may be performed, with the data set as input, to provide a reduced set of principal components that are uncorrelated and account for most of the variance in the input data set. An orthogonal transformation may be performed on the
15 reduced set of principal components to provide a rotated set of principal components that are aligned with the corresponding parameters in the input data set. Finally a logistic regression may be performed on the rotated set of principal components to derive an S-shaped predictive equation for the probability of a binary weather-related event of interest. An illustrative
20 embodiment of the invention is given for forecasting the probability for the number of lightning flashes exceeding a selected value, for the western United States climatological area.